ED 023 179 24 EA 001 675

Research Institute for State Educational Agency Personnel (March 25-April 7, 1967 and May 1-12, 1967). Final Report.
Denver Univ., Colo. Bureau of Educational Research
Spons Agency-Office of Education (DHEW), Washington, D.C. Bureau of Research
Bureau No-BR-7-0359
Pub Date 31 Jul 67
Grant-OEG-4-7-070359-2988
Note-69p.
EDRS Price MF-$0.50 HC-$3.55
Descriptors-*Educational Research, *Electronic Data Processing, *Institutes (Training Programs), Measurement Techniques, *Program Evaluation, Regional Laboratories, Research and Development Centers, Research Design, *State Departments of Education
Identifiers-Educational Research Information Centers, ERIC, PERT, Program Evaluation Review Technique

This report describes an institute designed to train State educational agency personnel in measurement in educational research, research design, program evaluation, Program Evaluation Review Technique (PERT), and automatic data processing. The institute also provided for a general orientation and overview of Educational Research Information Centers (ERIC), Regional Educational Laboratories, and Research and Development Centers. Strengths and weaknesses of the program, publicity, types and numbers of trainees, and the financing of the institute are also summarized. Information on registration procedures, daily schedules, evaluation of the institute by the staff, and evaluation of the institute by the participants is appended. (TT)

BR-7-0359
PA-24

FINAL REPORT

Grant No. OEG-4-7-070359-2988

RESEARCH INSTITUTE FOR STATE EDUCATIONAL AGENCY PERSONNEL

July 31, 1967

United States Department of
HEALTH, EDUCATION, AND WELFARE
Office of Education
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OFFICE OF EDUCATION

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RESEARCH INSTITUTE FOR STATE EDUCATIONAL AGENCY PERSONNEL

Grant No. OEG-4-7-070359-2988

March 25 to April 7, 1967
and
May 1 to May 12, 1967

The training program reported herein was conducted pursuant to a grant from the Office of Education, U.S. Department of Health, Education, and Welfare. Grantees undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment of the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

Bureau of Educational Research
University of Denver
Denver, Colorado

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Final Report
of
Research Institute for
State Educational Agency Personnel
Bureau of Educational Research
University of Denver

Orientation of Program

This institute was designed to provide thorough and practical training in research, automatic data processing, program evaluation and review technique. The institute also provided for a general orientation and overview of Educational Research Information Centers (ERIC), Regional Educational Laboratories, and Research and Development Centers.

The participants for the institute consisted of state educational agency personnel. The institute was sponsored by the Division of State Agency Cooperation and the Division of Research Training and Dissemination of the U.S. Office of Education. The trainee group accepted consisted of nineteen state educational agency personnel. The educational background and professional experience of the group was quite varied. Ten members of the group presently had research responsibilities for their respective state departments. The other nine were responsible for a variety of programs such as: adult education, teacher certification, finance, and safety education.

The duration of the inst.tute was for four weeks, consisting of two 2-week sessions. The first two week session began on March 25, 1967, and ended on April 7, 1967. The second two week session began on May 1, 1967, and ended on May 12, 1967.

Description of the Program

The schedule of instruction consisted of two daily sessions of three hours each. The class presentations were basically lectures by the instructors with adequate time for discussions. Practical exercises and problems were presented periodically in the form of hypothetical situations for the trainees to do during classtime and as a homework laboratory experience. The problem centered approach of instruction was used throughout the institute.

The first two week session included Measurement in Educational Research, Research Design, and Program Evaluation. The second two week session of the institute included five days on Program Evaluation Review Technique (PERT), three days on Automatic Data Processing, one day on Educational Research Information Centers (ERIC), and one day on Regional Educational Laboratories and R and D Centers.

The curricula was adapted to the specific needs of the participants and to the objectives of the institute. The specific course content for the various areas follows:

1. Measurement in Educational Research. The material covered included the meaning, characteristics, and processes of educational measurement and evaluation; statistical concepts; development and interpretation of standardized instruments, statistical tools and processes for testing validity and reliability; and instrument construction and interpretation.

2. Research Design. The Research design content included the basic principles of design and methodology; problems and hypothesis; variables and definitions; importance and uses of sampling and randomness; survey, descriptive, observational and other research methods and applications.

3. Program Evaluation. The program evaluation content included methodology and interpretation. The methodology covered theory, descriptive statistics, correlations, analysis of variance, and significance. The interpretation covered statistical presentations and analysis, interpretations of research data, and conclusions.

On a topical basis the following items were included in the first two week session by the instructional staff:

Role of research and education

Basic statistical concepts

Measure of variability

Skewness

Normal distribution

Research resources

Norms and measurement of achievement

Grade equivalents

Standard scores (Z-scores, T-scores)

Problems of interpretation

Correlation

Regression

Intelligence assessment

Sampling

Confidence intervals

Statistical significance

Type I and II errors

Analysis of Variance

Factual designs interaction

Differences in proportion (chi square)

Factor designs

Factor interaction

Analysis of covariance and quasi-experimentation

Measurement of affective variables

Self-report documents

Opinionaire and questionnaire

Semantic differential

Q-sort

Social Measurement-resources

Anxiety measurement

Creativity

Pre-experimental and quasi-experimental design

Sources of internal invalidity of experiments

Sources of external invalidity

Internal and external validity of selected experiments

Causation and correlation

True experiment design and quasi-experimental design

Experimental unit vs. unit of analysis

Elements, operation and activities of the evaluation of educational programs

Types of evaluation activities: formative vs. summative; instrumental vs. consequential

Analysis of the nature of evaluation plans in a sample of 484 Title I proposals

4. Program Evaluation Review Technique (PERT). Five days of the institute were devoted to Research Management with the major emphasis being on P.E.R.T. The Program Evaluation and Review Technique included: an orientation of the development of a systematic method of devising a program plan, checking the logic of it, and keeping track of it in operation. The instruction included an analysis and application of the network concept and flow chart techniques. The establishment of the cost base and programmed budgeting was also a part of the curriculum content.

On a topical basis the following items were included in the five day session on PERT:

Orientation to Research Management

Nature of management

Management process

Management information systems

PERT history

Establishing information base

Introduction to PERT

Network construction

Establishing time estimations

Network analysis

Scheduling the project

Resource allocation

Establishing the cost base

PERT/cost

Program budgeting

Computer processing of Base Data

Controlling as a Management Function

Up-dating

Management reports

Problem identification

Decision making

Application of management information systems to education

PERT implementation

5. Automatic Data Processing. The three days spent on automatic data processing as it relates to educational research included: general characteristics, principles and concepts; programming, functional operations, statistical calculations, and data analysis.

On a topical basis the following items were included in the sessions on automatic data processing:

Introduction to data processing in education

Administrative uses

Teaching A.D.P.

Computer assisted instruction

Introduction to electro-mechanical machines

The punched card

Key punch

Verifier

Sorter

Accounting machine

Interpreter

Reproducer

Collator

Introduction to computers

Computer programming

Systems development

Research applications

Local school relations

6. Educational Research Information Center (ERIC). The institute provided for a one day general orientation and overview of E.R.I.C. This overview included a general overview of the organization and function of E.R.I.C. and the specific operation of the E.R.I.C. Clearinghouse for Rural Education and Small Schools located at New Mexico State University, Las Cruces, New Mexico.

On a topical basis the following items were included in the session on ERIC:

Organization of ERIC

Objectives

Facilities and equipment

Documents and materials

Operational procedures of a clearinghouse

7. Regional Educational Laboratories. The institute program provided for a one-day general orientation and overview of the organization, function, and operation of the established Regional Educational Laboratories. Specific information concerning the program of activities of the various established laboratories was presented.

On a topical basis the following items were included in the session on Regional Educational Laboratories:

The establishment of regional laboratories

Function sample organizational structures

Financing

Operational procedures

Educational change

Relationships and roles of the Regional Laboratories to:

state departments of education, local school districts, higher education, and R. and D. Centers

The program was carried on in accordance with the approved proposal. There were no major changes in organization, operational procedures, or curricula content. The instructional staff made minor modifications wherein the background of the participants indicated that modifications were desirable. The organization and materials covered accomplished the objectives of the institute.

Evaluation of the Program

The evaluation of the program was based on (1) pre-tests and post-tests, and periodic mastery tests of the understandings of materials covered, (2) review of assignments given in work sessions and take home exercises, (3) evaluative reports by the trainees,

(4) general observations of the instructional staff and the program director. Through the use of the previously mentioned evaluative techniques, it did appear that the principle objectives and goals of the institute were successfully accomplished.

Program factors. The evaluation of the portions of the institute devoted to research design and statistics indicate that the objectives were accomplished. The pre-test (patterned after Stanley's AERA approach) sampled the level of understanding that the trainees had with regard to research terms and concepts. Their understanding and computational ability with regard to statistics and research design as measured on a five point scale on the pre-test indicated that the understanding level and computational skills were predominantly at the middle and lower level of the scale. When the same instrument was applied as a post test, the level of understanding and computational skills moved sharply to the upper level of the scale. A complete summary of the before mentioned pre-test and post test may be found in Appendix B. An analysis of the individual participant evaluations of the research design and statistics portion of the institute also indicated that the goals and objectives were met successfully. The participants were asked to respond to questions concerning (1) the program of study, (2) organization and administration, (3) expectations, and (4) to make any additional comments concerning the institute. The participants' evaluations of the program of study were positive with particular emphasis given to the appropriateness of material presented and the high quality of class instruction. The participants also indicated that the organization and administration of the institute was very satisfactory in all aspects except for not providing housing on the campus.

The evaluation of the one week session on Program Evaluation Review Technique met the expectations of the participants and the objectives of the institute. All of the participants agreed that the instruction and materials received would contribute a great deal to their work in educational research and development. A complete summary of the participants' evaluation of the session on PERT may be found in Appendix B.

The participants' reactions to the three days spent on Automatic Data Processing was positive. The high quality of instruction and the appropriateness of materials covered were the areas most often mentioned by the trainees. The visitations to two separate centers using automatic data processing was a worthwhile experience for the participants.

The participants did not find the one day spent on ERIC as worthwhile as the session on Regional Laboratories and R. and D. Centers. The major criticism of the one day spent on ERIC was based on major emphasis being placed on a local operation rather than an overall orientation and overview of the program in general.

The number of staff members was quite adequate for the number of participants. With eighteen trainees attending the first session and nineteen attending the second session, it was possible for the instructional staff to provide more attention to individual needs. This smaller group also enhanced the effectiveness of the discussion periods. The instructional staff had sufficient time to adequately prepare assignments, duplicate hand-out materials, and testing material. The director and the research assistant were able to schedule sufficient time to perform the necessary organizational and administrative tasks. Adequate secretarial assistance was provided for all aspects of the institute.

The Bureau of Educational Research, University of Denver, was not involved in the development of selection criteria for the institute. The names of the participants selected for the institute were submitted to the institute director from the United States Office of Education, Division of State Agency Cooperation and the Division of Research Training and Dissemination. The original list of participants nominated for the institute consisted of thirty candidates. Twenty-eight candidates preregistered for the institute. Eighteen candidates attended the first two week session while nineteen attended the second two week session. Those candidates who preregistered but did not attend, indicated that their absence was due to unexpected job responsibilities and conflicting dates. A number of candidates were unable to attend due to their responsibilities in connection with state legislative sessions.

There did not appear to be any major problems related to the organization of the institute. The trainees particularly favored dividing the institute into two two-week session spaced approximately a month apart. Daily schedules were planned in advance so that trainees had a long-range view of the presentations. Minor modifications were made in order to adjust to the rate of progress of the trainees. The classroom was adequate for the number of trainees who participated. A variety of resource materials was available for the participants through the Bureau of Educational Research and the University library.

The budget for living allowance, staff salaries and time was more than adequate. Several minor internal line item transfers were necessary. This was particularly true in the area of supplies-expenses and rental of equipment. The initial budget estimate for supplies and expenses was not adequate while the estimated budget for rental of equipment was considerably more than needed. The total amount expended was $20,810.32 less than originally budgeted. This was due mainly to the number of trainees being less than expected.

Strengths and weaknesses. The major strength of the institute was undoubtedly the instructional staff employed. The professional staff employed were unquestionably outstanding authorities in their respective fields. Their enthusiasm for teaching and methods of presentation was reflected in the high motivation of the trainee group. The methods of presentation and media used were characterized by a variety of procedures. All the participants were unanimous in their assessment of the following:

1. The purpose of the institute was clearly outlined
2. The objectives were realistic
3. Materials presented were of value to each individually as well as collectively
4. Solutions to individual problems and questions were considered
5. The instructors were well qualified
6. The sessions followed a logical order

7. The schedule provided for adequate flexibility without loss of continuity
8. Opportunity was provided for exchange of ideas and informed discussion
9. The institute was well organized and administered
10. The large volume of duplicated materials, texts, and other resource materials provided were appropriate and will be of value both immediately and in the future.

The only major weakness encountered in the institute was the inability of the university to provide housing on campus for all the participants.

It was the opinion of some of the participants that the time spent on ERIC and Regional Laboratories would have been better spent on an additional two days on automatic data processing. (This was particularly true of the day spent on ERIC.)

The facilities provided were not unusual, though adequate. The timing of the institute was satisfactory except in those cases where the state department employees had obligations in legislative matters in those states where the legislature was in session during the time of the institute.

No minor difficulties were encountered with the administrative relationships with the USOE. The office was very cooperative in answering all inquiries. The only suggested improvement would be in allowing the project director to approve or disapprove substitute enrollees when a late cancellation of a previously approved candidate occurs.

The overall evaluation of the institute indicates that it was successfully carried out, that the trainees benefited considerably, and that the institute accomplished its objectives. This statement is supported by the pre-tests and post-tests administered, the individual written overall evaluation by each trainee, the opinion of the instructional staff, the opinion of the project director, and the informal observation of comments by the participants.

PROGRAM REPORTS

1. Publicity

The institute was publicized through a written communique to the chief State School Officers from the U.S.O.E., Office of the Director, Division of State Agency Cooperation. This communique explained the nature and purposes of the institute, location, schedules, and the name of the director. The state school officer had the opportunity to nominate three people to participate. Candidates accepted sent preregistration forms directly to the Director of the Institute. All preregistered nominees were contacted by the Director of the Institute and sent information concerning housing, travel, classroom location, and a more detailed resume of the nature of the curriculum.

2. Application Summary

a. Approximate number of inquiries from prospective trainees — 35

b. Number of completed applications received — Done by USOE

c. How many applicants were offered admission — 33

3. Trainee Summary

a. Number of trainees initially accepted in program — 30

Number of trainees enrolled at the beginning of program — 18

Number of trainees who completed program — 19

b. Categorization of trainees

(1) Number of trainees who principally are elementary or secondary school teachers — none

(2) Number of trainees who are principally public school administrators or supervisors — none

(3) Number of trainees from state education groups — 19

(4) Number of trainees from colleges or universities, junior colleges, research bureaus, etc. — none

4. Program Director's Attendance

a. What was the number of instructional days for the program? — 20

b. What was the percent of days the director was present? — 90%

FINANCIAL SUMMARY
RESEARCH INSTITUTE - PROJECT NO. 7-0359

DIRECT COSTS	BUDGETED	EXPENDED	BALANCE
Personnel			
Faculty	$ 4,400.00	$ 4,400.00	0
Secretary	800.00	800.00	0
Graduate Assistant	500.00	500.00	0
Fringe Benefits	495.00	495.00	0
Staff Travel	1,475.00	646.30	828.70
Staff-Per Diem	640.00	720.00	-80.00
Supplies and Equipment	1,390.00	1,110.91	279.09
Trainee Support			
Travel	4,800.00	4,826.11	-26.11
Per Diem	12,480.00	7,312.00	5,168.00
Totals	$26,980.00	$20,810.32	$ 6,169.68

APPENDIX A

PRE-REGISTRATION FORM

Research Training Institute for State Agency Personnel - Co-sponsored by the Division of Research Training and Dissemination and the Division of State Agency Cooperation of the United States Office of Education.

Dear Institute Participant:

Would you take a few moments to fill in the data from below and send it to the Institute Director? Your cooperation will make it possible for those conducting the Research Institute to gear the content more nearly to your background and needs.

Name: _____

Position Title: _____

State: _____

How long have you been in your current position? _____

How long have you been in the State Department? _____

Length of service in education? _____

What level(s)? Elementary _____ Secondary _____ College _____

Degrees: Bachelors _____ Major _____
Masters _____ Major _____
Doctorate _____ Major _____

What research responsibilities do you have in the State Department?

_____

_____

_____

Have you had courses in statistics? _____
If so, how many hours? _____

Do you have training in research? _____
If so describe briefly.

_____

_____

Are you now responsible for any program of research? _____
If so, what kind?

_____

_____

_____

Please send completed form to attached address. Thank you.

UNIVERSITY OF DENVER University Park
COLORADO SEMINARY Denver, Colorado 80210
BUREAU OF EDUCATIONAL RESEARCH

March 15, 1967

The first meeting scheduled for the Research Institute for State Department Personnel will be held at 9:00 A.M., March 27, 1967, at the Bureau of Educational Research, University of Denver. I have enclosed a map of the university campus with the Bureau of Educational Research marked by a red circle.

Living accommodations have been arranged for you at the Belcaro Motel. This motel is approximately two miles from the campus. Arrangements have been made to provide transportation for you from the motel to the campus on Monday, March 27. Please be at the Belcaro office at 8:45 A.M., Monday. Should you plan to arrive later than 6:00 P.M. on either March 25 or March 26, you should personally contact the Belcaro Motel. I have also enclosed a brochure from the motel.

Should you have any problems or questions when you arrive in Denver, please call Mr. Lee Thomson, home phone number 757-1337, or Mr. Alvie Shaw, home phone number 757-2508.

If you are traveling by public carriage, please retain your ticket receipt. We will make every effort to reimburse your travel expenses at the end of the first week of the institute.

Other necessary information will be provided at the first session of the institute.

We are looking forward to seeing you in the near future.

Sincerely,

Alvie L. Shaw
Assistant to Dr. R. A. Forsythe,
Institute Director

ALS:baj

Enclosures: 2

RESEARCH INSTITUTE
FOR
STATE EDUCATIONAL AGENCY PERSONNEL

Session I - March 27, 1967, to Aptil 7, 1967

Measurement in Educational Research, Research Design, and Program Evaluation

AGENDA FOR OPENING SESSION

Monday - March 27, 1967

9:00 A.M. - 9:30 A.M.	Informal Get-Acquainted Coffee - Conference Room - Bureau of Educational Research, University of Denver
9:30 A.M. - 10:00 A.M.	Welcome and Introductory Talks 1. Dr. R. A. Forsythe - Institute Director 2. Dr. E. A. Lindell, Dean, College of Arts and Sciences 3. Dr. W. M. Slaichert, School of Education
10:00 A.M. - 10:15 A.M.	Information Concerning Details of Institute (housing, travel reimbursement, meals, lab sessions, etc.) Mr. Alvie Shaw - Research Assistant
10:15 A.M. - 10:30 A.M.	General Overview and Format of Institute Dr. R. A. Forsythe - Institute Director
10:30 A.M. - 11:00 A.M.	Outline of Course Work Content and Course Work Procedures Dr. Kenneth Hopkins - Instructor Dr. Gene Glass - Instructor
11:00 A.M. - 11:30 A.M.	Pre-test Given to All Participants (Measurement in Educational Research & Research Design)
11:30 A.M. - 1:00 P.M.	Lunch Break
1:00 P.M. - 2:20 P.M.	Dr. Hopkins (Lesson I)
2:20 P.M. - 2:40 P.M.	Coffee Break
2:40 P.M. - 4:00 P.M.	Dr. Glass (Lesson II)

UNIVERSITY OF DENVER University Park
COLORADO SEMINARY Denver, Colorado 80210
BUREAU OF EDUCATIONAL RESEARCH

April 18, 1967

The first meeting scheduled for the second half of the Institute (May 1 through May 12) for State Department Personnel will be held at 9:00 A.M., May 1, 1967, at the Bureau of Educational Research, University of Denver. Enclosed you will find a complete schedule for the first week of the institute.

If for some reason you find you are unable to attend this two week session, I would appreciate your notifying me by return mail.

Should you have any problems or questions when you arrive in Denver, please call Mr. Lee Thomson, home phone number 757-1337, or Mr. Alvie Shaw, home phone number 757-2508.

We are looking forward to seeing you on May 1, 1967.

Sincerely,

Alvie L. Shaw
Assistant to Dr. R. A. Forsythe
Institute Director

ALS:baj

Enclosure

BUREAU OF EDUCATIONAL RESEARCH

University of Denver
Denver, Colorado

INSTITUTE

Second Two Week Session (May 1 through May 12)

Program	Date	Instructor
P.E.R.T.	May 1 through May 5	Desmond Cook Mrs. King
Automatic Data Processing	May 8, 9, 10	Ralph VanDusseldorp Pete McGraw
E.R.I.C.	May 11	Edgar Charles
Regional Educational Laboratory and R.D. Centers	May 12	James Thrasher

SECOND TWO WEEK SESSION

The Organization

1. Daily

The second session of the Institute program will be conducted as a workshop. The workshop will consist of lectures, discussions, laboratory experience, and visitations. The ten day session will be scheduled as follows:

P.E.R.T.	5 days	May 1 to May 5
Automatic Data Processing	3 days	May 8, 9, 10
E.R.I.C.	1 day	May 11
Regional Educational Laboratory	1 day	May 12

A more detailed breakdown of the four areas to be covered is:

Automatic Data Processing

1. Orientation
   a. cards
   b. sorters
2. Computer
   a. punching and programming
   b. systems (schools)
3. Utilization
   a. cards analysis
   b. computer analysis

(The program will include laboratory experiences with the various data processing equipment. There will also be arranged visitations to the International Business Machines Training Center in Denver, The Denver Research Institute, a school district utilizing data

processing, and the Colorado State Department of Education data processing center.)

Program Evaluation and Review Technique

1. General Orientation,
2. Network Concept,
3. Flow Chart Techniques,
4. Application of Network Concepts and Flow Chart Techniques.

Educational Research Information Center

1. Lecture, display of materials, and general discussion.

Regional Educational Laboratories

1. Lecture and general discussion,
2. Visit to the Rocky Mountain Educational Laboratory.

RESEARCH INSTITUTE
FOR
STATE EDUCATIONAL AGENCY PERSONNEL

Bureau of Educational Research
University of Denver
Denver, Colorado 80210

PARTICIPANTS

Name	Position	Location
1. Jerry Barton	Director of Research	Texas
2. Milt Baum	Director of Research	Oregon
3. Charles Bostrom	Director, Division of Statistics and Data Processing	Colorado
4. Duane Carr	Statistical Analyst	Utah
5. Elmer Clausen	Director, Adult Education	Washington
6. Joanne Clemmer	Research Analyst	Oregon
7. Richard Gunkel	Director of Federal Programs	Nevada
8. William Hiblar	Program Assistant, Safety Education	Washington
9. Perry Keithley II	Statistician	Washington
10. Lamar LeFevre	Coordinator, 8 State Project	Nevada
11. James McNamara	Research Associate	Pennsylvania
12. Robert Nichols	Occupational Research	Texas
13. Charles Nix	Director, Assessment and Research	Texas
14. Elvin H. Ossmen	Specialist, Research and Statistics	Utah
15. Chris Pipho	Consultant, Research and Development	Colorado
16. Francis Rist	Teacher Education and Certification	Idaho

Name	Position	Location
17. Billy Siler	Director of Research	Oklahoma
18. Howard Snortland	Director, Finance Statistics	North Dakota
19. Quentin Utley	Administrator, Division of Elementary and Secondary Education	Utah
20. Gustave Lieske	Director of Research	Nebraska
21. David Jesser	Project Director	Nevada

APPENDIX B

DR. HOPKINS

Monday, A.M., March 27, 1967

Role of research and education

Basic statistical concepts

Measure of variability

Skewness

Normal distribution

Tuesday, A. M., March 28, 1967

Research Resources

- Encyclopedia of Educational Research
- Handbook of Research on Teaching
- Review of Educational Research
- Mental Measurements Yearbook
- Tests in Print

Selecting a Criterion

- "Jingle" and "jangle" fallacies

Methods of Reporting Results -- Comparing Relative Performance

- Norms and Reference Groups
  - Inadequacy as a control group
  - Importance of time of administration
  - Extrapolation-Interpolation of units
- Grade Equivalents
  - Plateau effects
  - Non-equivalence within a battery or between tests
- Percentiles
  - Inequality of units
- Standard Scores
  - Advantages
  - Z-scores, T-scores

DR. HOPKINS

Wednesday, A.M., March 29, 1967

Correlation, Regression and Prediction

Interpretation

Not a "per cent", inequality of units
Not causation
Independent of mean and variability differences between X and Y
Relative distance from mean ($Z_y{}^1 = rZ_x$)

Effects of heterogeneity-selection

Prediction

Standard error of estimate

Education Illustrations

Driver training, TMR, ERM programs

Thursday, A. M., March 30, 1967

Expectancy

Statistical Significance

Sampling distribution
Standard error
.05, .01 levels
vs. practical significance

Confidence Intervals

Type I and II errors

DR. HOPKINS

Friday, A. M., March 31, 1967

Comparing means - t-ratio

- Interpreting statistically significant difference
- Interpreting confidence intervals

Measurement of "Intelligence", scholastic aptitude, etc.

- Multi-dimensional nature
- Meanings of IQ score
  - Group vs. Individual tests
  - Language-Verbal test vs. Non-language Performance test
  - Ratio vs. Deviation IQs
  - "Cultures-fair" tests
  - IQ constancy and age -- role of chance
  - Reading factor and IQ scores
  - Nature-nurture considerations
  - Prediction vs. Potential
  - Standard error of measurement

DAILY SCHEDULE

MEASUREMENT - STATISTICS

DR. HOPKINS

Monday, A. M., April 3, 1967

Differences in propostion

Chi square

Sampling

Confidence interval for proportions
Sample size effects

The analysis of variance

Interpretation and utilization

Two factor designs

Role in "individualized" instruction
Interaction
Practice in interpretation

Tuesday, A.M., April 4, 1967

Review of Basic Concepts in Statistical Inference

Further consideration of factorial designs

Three factor designs
Two factor interaction

Rationale and interpretation

Wednesday, A. M., April 5, 1967

Further considerations of factorial design and interaction case studies

The analysis of covariance and quasi-experimentation

Role in compensation for bias-adjusted means
Role in statistical power consideration
Assumptions
Illustration and interpretation

DR. HOPKINS

Thursday, A. M., April 6, 1967

Additional illustrations of ANCOVA

Interpretation of higher order interactions

Lab session: designing a research study to answer specific questions

Friday, A. M., April 7, 1967

Measurement of Affective Variables

General problems

Self-report documents
Opinionaire and questionnaire

Newer technique

Semantic Differential
Q-sort

Social Measurement - resources

Anxiety measurement

Creativity

DAILY SCHEDULE

Research Design - Dr. Glass

Monday, P. M., March 27, 1967

1. Pre-experimental and quasi-experimental design
2. Sources of internal invalidity of experiments

Materials handed out:

1. "Definition of Sources of Internal and External Validity" (Glass)
2. "A Critique of Experiments on the Role of Neurological Organization in Reading Performance" (Glass)
3. "Experimental and Quasi-experimental Designs for Research" (D. T. Campbell and J. C. Stanley)

Tuesday, P. M., March 28, 1967

1. Sources of external invalidity
2. Discussion of illustrations of internal and external invalidity

Materials handed out:

1. "Illustrations of Internal and External Invalidity" (Glass)

Wednesday, P. M., March 29, 1967

1. Discussion of studies in "A Critique of Experiments on the Role of Neurological Organization in Reading Performance"
   a.. The internal and external validity of selected experiments
   b. Causation and correlation

Thursday, P. M. March 30, 1967

1. True experimental designs and quasi-experimental designs
2. Experimental unit vs. unit of analysis
3. Mastery test on experimental design

Materials handed out:

1. "The Experimental Unit and the Unit of Statistical Analysis: Comparative Experiments with Intact Groups" (Glass)
2. "The Countenance on Educational Evaluation" (R. E. Stake)

DR. GLASS

Friday, P. M., March 31, 1967

1. Common misconceptions about evaluation

2. Introduction to a Modern Strategy of Educational Evaluation

Materials handed out:

1. "Remarks on Evaluation of Education Programs" (Glass)

2. "Misconceptions about Evaluation?

DR. GLASS

Monday, P. M., April 3, 1967

1. The elements, operations and activities of the evaluation of educational programs

2. Types of evaluation activities: formative vs. summative; instrumental vs. consequential

3. Discussion of the nature of evaluation plans in a sample of 484 Title I proposals

Materials used:

1. "Materials on the Evaluation of Educational Programs" (Glass), pp. 1-2

2. "Types of Evaluation Techniques in Title I Project Proposals" (Morrison)

Tuesday, P. M., April 4, 1967

1. The plan for an evaluation of a fictitious Title I program

2. The assessment of attitudes

Materials used:

1. "Remarks on the Evaluation of Educational Programs" (Glass), pp. 3-7.

Wednesday, P. M., April 5, 1967

1. Examination of an exemplary evaluation of an educational program

2. Discussion of bibliography of references to other exemplary evaluation reports

Materials used:

1. "Report of the AERA 1966 Pre-session on Experimental Design" (Stake, Glass, Taylor)

2. "Examples of Evaluations of Educational Programs" (A bibliography)

Thursday, P. M., April 6, 1967

1. Distribution and discussion of a bibliography of 230 references in educational evaluation

Materials used:

1. "Bibliography of References in Evaluation" (Stake)

DR. GLASS

Friday, A.M., April 7, 1967

1. Administration and scoring of a mastery test on evaluation

Materials used:

1. "Mastery Test on Evaluation" (Glass)

RESEARCH INSTITUTE
FOR
STATE EDUCATIONAL AGENCY PERSONNEL

Bureau of Educational Research
University of Denver
Denver, Colorado 80210

Session II - May 1, 1967, to May 5, 1967

DAY	TOPIC	INSTRUCTOR	REFERENCE
Monday - AM	Administrative Matters Orientation Nature of Management Management Process Management Information Systems Research Management PERT History	Cook	Cook, pp. 1-9 Cook - "New Approach" Woodgate, Ch. 1
Monday - PM	Establishing Information Base Introduction to PERT Network Construction	King	Cook, pp. 10-19 Woodgate, Ch. 2,3,4 PERT Film
Tuesday - AM	Establishing the Time Base Activity Time Estimation Network Analysis	King	Cook, pp. 19-31 Woodgate, Ch. 5-6
Tuesday - PM	Work Session	King and Cook	
Wednesday - AM	Scheduling the Project Resource Allocation	Cook	Woodgate, Ch. 8,12
Wednesday - PM	Establishing the Cost Base PERT/Cost Program Budgeting	King	Cook, pp. 31-34 Woodgate, Ch. 10,11 PERT/Cost film
	Computer Processing of Base Data	Cook	Cook, pp. 72-76 Woodgate, Ch. 14
Thursday - AM	Controlling as a Management Function Up-dating Management Reports Problem Identification Decision-making	Cook	Cook, pp. 77-83 Woodgate, Ch. 9
Thursday - PM	Group Discussion on Application of Management Information Systems to Education	Cook, King and Group Leaders	Cook, Ch. 3
Friday - AM	Educational Applications PERT Implementation Summary Critique	Cook King Cook	Cook, pp. 83-86 Woodgate, Ch. 13

May, 1967

RESEARCH INSTITUTE
FOR
STATE EDUCATIONAL AGENCY PERSONNEL

Bureau of Educational Research
University of Denver
Denver, Colorado 80210

DAY	TOPIC	INSTRUCTOR
Monday - AM	Introduction to Data Processing in Education Administrative Uses Teaching A. D. P. Computer Assisted Instruction	McGraw
	Introduction to Electro-Mechanical Machines The Punched Card Key Punch Verifier Sorter Accounting Machine	McGraw
Monday - PM	Introduction to Electro-Mechanical Machines (Continued) Interpreter Reproducer Collator	VanDusseldorp
	Introduction to Computers	VanDusseldorp
Tuesday - AM	Demonstration of Electro-Mechanical Machines	McGraw and VanDusseldorp
	Computers (Continued)	VanDusseldorp
Tuesday - PM	Computers (Continued)	VanDusseldorp
	Computer Programming Systems Development Computer Demonstration	VanDusseldorp
Wednesday - AM	Research Applications	VanDusseldorp
Wednesday - PM	Local School Relations	VanDusseldorp

APPENDIX C

CRITIQUE OF INSTITUTE BY PROFESSIONAL STAFF

FIRST SESSION

Dr. Gene Glass

Indicate your observation and judgment by checking each item in one column at the left, then by amplifying your response in the blank at the right when appropriate. Use additional paper if needed. Items not applicable or not subject to your observation should be omitted. Be frank.

			1. Environmental conditions	
			a. Classroom spaces	Setting was more uncomfortable than need be. Chairs were murder. Noise was bad.
			b. Work spaces	
	x		c. Living quarters	
	x		d. Teaching equipment, aids (chalk boards, public address system, etc.)	
	x		e. Resource material, library	
	x		f. Eating facilities	
			2. Participants	
			a. Appropriateness of academic backgrounds	
	x		b. Sufficiency of research experience	
x			c. Willingness to work	
	x		d. Intellectual curiosity	
x			e. Concern for applicability of techniques	
	x		f. Aspiration	
	x		g. Immediate preparation for Presession	
			3. Organization	
			a. Adequacy of notice to prospective applicants	Not in a position to judge.
			b. Sufficiency of preplanning	
			c. Smoothness of operation	
			d. Adaptability to obstacles and feedback	
			e. Sensitivity to grievances	
	x		f. Adequacy of financial support	
			4. Schedule	
	x		a. Appropriateness of 10 days for the job	Overly long, perhaps.
	x		b. Time spent efficiently	
			c. Events sequenced appropriately	
	x		d. Punctuality	
		x	e. Balance between formal, informal affairs	Provide more opportunities for informal discussions.
		x	f. Quantity of discussions	
		x	g. Quality of discussions	
	x		h. Quality of formal presentations	
			i. Unobtrusiveness of evaluation efforts	
	x		j. Methods of evaluation	Quite good, really.

5. Outcomes

__ x __	a.	Intended content was actually taught	
__x__ __	b.	Increase in participant understanding	
__ __ __	c.	Improvement in attitude toward research	Hard to say. Hope-
__ __ __ ?	d.	Personal associations initiated	fully "satisfactory."

6. In general was the Presession well organized?

Yes, though preparation time for myself was too short. Construction work going on outside 104 Iliff was annoying and distracting. If it's still going on in May, change lecture rooms.

7. Were the facilities at the Center (not the motel) suitable for the activities which you had planned? If not, specify.

Not applicable.

8. Did it make a difference, favorable or unfavorable, to have the Presession scheduled in the same city as the AERA meetings?

Not applicable.

Should Presessions be limited to the same hotel, or the same city, in which the annual meetings will be held?

Not applicable.

9. Were you satisfied with the group of "student" participants selected? How could the selection have been improved?

Participants appear to have been "tapped" by someone in their office as opposed to having applied of their own volition.

10. Did you perceive the participants to be reasonable well satisfied with the 10 day experience?

By and large.

11. As a lecturer were you bothered by interruptions of your lectures?

No.

12. At two points during the Presession sets of questions about the organization and management of activities were administered to the participants. Their responses were tallied and given to you. How did you respond to the knowledge of the participants' responses? Did you disregard them? Change plans? Did you find this polling of participants useful or nearly useless?

The pre-test was quite useful to me in lecturing.

13. Were you to do the same assignment over, in what major ways, if any, would you change your contribution?

14. Do you wish that the Director had made firmer arrangements to assure participants and you of the staff opportunity to meet in pairs or small groups?

    Yes.

15. Were the objectives you set for yourself during the Presession attained? (Have we missed opportunities to evaluate how well objectives have been attained?)

    Objectives were attained by and large.

16. Are you inclined to urge your colleagues to become staff members for such an institute or Presession?

    Depends on which colleague.

17. Do you believe that the research practices of the participant group will be improved as a result of their participation?

    Difficult to say. They should become better (more critical) consumers and evaluators of research.

18. In what ways, if any, did you as a staff member benefit personally as a result of your participation in this Presession?

    Gained familiarity with a formerly unknown element (State Department).

19. In your opinion, how does education benefit from this kind of session?

    It most certainly benefits.

CRITIQUE OF INSTITUTE BY PROFESSIONAL STAFF

FIRST SESSION

Dr. Kenneth Hopkins

Indicate your observation and judgment by checking each item in one column at the left, then by amplifying your response in the blank at the right when appropriate. Use additional paper if needed. Items not applicable or not subject to your observation should be omitted. Be frank.

	1.	Environmental conditions
X	a.	Classroom spaces
X	b.	Work spaces
X	c.	Living quarters
X	d.	Teaching equipment, aids (chalk boards, public address system, etc.)
X	e.	Resource material, library
X	f.	Eating facilities
	2.	Participants
X	a.	Appropriateness of academic backgrounds
X	b.	Sufficiency of research experience
X	c.	Willingness to work
X	d.	Intellectual curiosity
X	e.	Concern for applicability of techniques
X	f.	Aspiration
X	g.	Immediate preparation for Presession
	3.	Organization
X	a.	Adequacy of notice to prospective applicants
X	b.	Sufficiency of preplanning
X	c.	Smoothness of operation
X	d.	Adaptability to obstacles and feedback
X	e.	Sensitivity to grievances
X	f.	Adequacy of financial support
	4.	Schedule
X	a.	Appropriateness of 10 days for the job
X	b.	Time spent efficiently
X	c.	Events sequenced appropriately
X	d.	Punctuality
X	e.	Balance between formal, informal affairs
X	f.	Quantity of discussions
X	g.	Quality of discussions
X	h.	Quality of formal presentations
X	i.	Unobtrusiveness of evaluation efforts
X	j.	Methods of evaluation

5. Outcomes

X		a. Intended content was actually taught
X		b. Increase in participant understanding
X		c. Improvement in attitude toward research
	X	d. Personal associations initiated

6. In general was the Presession well organized?

Yes.

7. Were the facilities at D.U. suitable for the activities which you had planned? If not, specify.

Yes.

8. Did it make a difference, favorable or unfavorable, to have the Presession scheduled in the same city as the AERA meetings?

Not applicable.

9. Were you satisfied with the group of "student" participants selected?

Yes.

How could the selection have been improved?

Better description of program to participants and State Department of Education.

10. Did you perceive the participants to be reasonably well satisfied with the 10 day experience?

Yes.

11. As a lecturer were you bothered by interruptions of your lectures?

No.

12. At two points during the Presession sets of questions about the organization and management of activities were administered to the participants. Their responses were tallied and given to you. How did you respond to the knowledge of the participants' responses? Did you disregard them? Change plans? Did you find this polling of participants useful or nearly useless?

Did not disregard them. Changed plans. Found the polling of the participants to be nearly of the same value.

13. Were you to do the same assignment over, in what major ways, if any, would you change your contribution?

    No major changes.

14. Do you wish that the Director had made firmer arrangements to assure participants and you of the staff opportunity to meet in pairs or small groups?

    No.

15. Were the objectives you set for yourself during the Presession attained? (Have we missed opportunities to evaluate how well objectives have been attained?)

    I think the objectives were attained.

16. Are you inclined to urge your colleagues to become staff members for such an institute or Presession?

    Yes.

17. Do you believe that the research practices of the participant group will be improved as a result of their participation?

    Yes.

18. In what ways, if any, did you as a staff member benefit personally as a result of your participation in this Presession?

    From the feedback from the "field."

19. In your opinion, how does one benefit from this kind of Presession?

    Not applicable.

I judge the two week session to have been highly successful in attaining its objectives. The group was very responsive and appeared to follow through very well on assignments. Several of the participants expressed regret that some of their colleagues were not here, and felt they might have been if they had known more explicitly the nature of the institute. A couple felt that some useful information would have resulted if they had united together as a group--they would be resource persons for each other. In total, however, this institute was more successful than I really had anticipated.

APPENDIX D

INSTITUTE PARTICIPANT EVALUATIONS

Please respond briefly to the following questions:

I. Regarding program of study.

A. What were the strengths of the Institute program?

A very good staff -- and course content.

B. What were the weaknesses of the Institute program?

ERIC

C. How appropriate were the materials covered for your particular needs?

Very good

D. How would you improve the program?

Needs an extension in the area of evaluation.

II. Regarding organization and administration.

A. Was the length of the Institute adequate?

Yes

B. Was the time of year satisfactory?

Yes

C. Were housing accommodations satisfactory?

Yes

D. Were classroom accommodations satisfactory?

Need better classrooms

E. Did you have adequate materials?

Yes

F. Were you satisfied with the manner by which the administrative details were carried out?

Yes

III. Expectations

A. What did you expect to get out of the Institute before you came?

Very much the same as presented.

B. Were your expectations reached?

Yes

IV. Please list any other comments you wish to make concerning the Institute. (First and/or second session)

It was a well run institute, Exceptional staff.

INSTITUTE PARTICIPANT EVALUATIONS

Please respond briefly to the following questions:

I. Regarding program of study.

A. What were the strengths of the Institute program?

The quality of the instructors.

B. What were the weaknesses of the Institute program?

Classroom facilities; inconvenient housing
*Insufficient togetherness as a group in eating, housing, entertainment.

C. How appropriate were the materials covered for your particular needs?

Very good

D. How would you improve the program?

See "B" above.
A session on staffing and operating a local or state research and development program.

II. Regarding organization and administration.

A. Was the length of the Institute adequate.

I don't think it could be shortened but my duties at home suffered because it was too long.

B. Was the time of year satisfactory"

The first two weeks interferred with legislative sessions.

C. Were housing accommodations satisfactory?

NO

D. Were classroom accommodations satisfactory?

NO

E. Did you have adequate materials?

The second two weeks--NOT the first two weeks.

F. Were you satisfied with the manner by which the administrative details were carried out?

YES

III. Expectations.

A. What did you expect to get out of the Institute before you came?

Something more than I did in regard to staffing and operation of a local or state department of research and development.

B. Were your expectations reached?

More than sufficient except for item III A. above.

IV. Please list any other comments you wish to make concerning the Institute. (First and/or second session)

We are ever so grateful to instructors; the Bureau administration; the graduate assistants, and the office women.

INSTITUTE PARTICIPANT EVALUATIONS

Please respond briefly to the following questions:

I. Regarding program of study.

A. What were the strengths of the Institute Program?

Knowledge of instructors and effective time parameter.

B. What were the weaknesses of the Institute program?

ERIC -- not necessary

C. How appropriate were the materials covered for your particular needs?

Excellent

D. How would you improve the program?

No comment

II. Regarding organization and administration.

A. Was the length of the Institute adequate?

Yes

B. Was the time of year satisfactory?

Yes

C. Were housing accommodations satisfactory?

D. Were classroom accommodations satisfactory?

Questionable noise, etc.

E. Did you have adequate materials?

Yes

F. Were you satisfied with the manner by which the administrative details were carried out?

Yes

III. Expectations.

A. What did you expect to get out of the Institute before you came?

Knowledge in content and identification of personal materials in research, statistics, and data processing.

B. Were your expectations reached?

Very definitely.

IV. Please list any other comments you wish to make concerning the Institute. (First and/or second session)

This by far was one of the best workshops I have ever attended. Particularly in regard to my responsibilities in Statistics, Data Processing, and information system, administratively for planning and decision making.

The staff should be commended for their excellence.

INSTITUTE PARTICIPANT EVALUATIONS

Please respond briefly to the following questions:

I. Regarding program of study.

A. What were the strengths of the Institute program?

Administration.
Excellent instructors.

B. What were the weaknesses of the Institute program?

None observed.

C. How appropriate were the materials covered for your particular needs?

I would have liked more time in Data Processing.

D. How would you improve the program?

For over-all needs, I have no suggestion.

II. Regarding organization and administration.

A. Was the length of the Institute adequate?

Yes

B. Was the time of year satisfactory?

Yes

C. Were housing accommodations satisfactory?

Yes

D. Were classroom accommodations satisfactory?

Yes

E. Did you have adequate materials?

Yes

F. Were you satisfied with the manner by which the administrative details were carried out?

Very much so. Mr. Shaw has my congratulations along with the rest of the research staff.

III. Expectations.

A. What did you expect to get out of the Institute before you came?

I had no particular anticipation.

B. Were your expectations reached?

Four weeks well spent, particularly the second two.

IV. Please list any other comments you wish to make concerning the Institute. (First and/or second session)

I could list many; they would all be good.

PRE - TEST SUMMARY

EVALUATION INSTRUMENT
EDUCATIONAL RESEARCH AND STATISTICS

lease encircle the code letter which best describes your knowledge
f <u>each</u> item in the instrument.

A - Thoroughly understand
B - Fair understanding
C - Some understanding
D - Have only heard of it
E - Have never heard of it

		Understanding Level				
		A	B	C	D	E
. Internal and external validity	A B C D E			7	7	4
. Ex post facto research	A B C D E			5	7	6
. Control group	A B C D E	2	11	4	1	
. Random sampling	A B C D E	3	9	6		
. Sampling errors	A B C D E		4	8	5	1
. Type I errors	A B C D E	1	1	3	5	7
. Type II errors	A B C D E		2	3	5	7
. Dependent variable	A B C D E		4	6	4	3
. Independent variable	A B C D E	2	4	5	4	3
. Interval scale	A B C D E	1	1	6	4	5
. Nominal scale	A B C D E	1	1	5	6	5
. Non-parametric	A B C D E	1	1	4	5	7
. Population	A B C D E	5	7	5	1	
. Continuous vs. discrete data	A B C D E	1	2	5	7	3
. "True" experiment	A B C D E			6	6	6
. Normal curve	A B C D E	4	11	3		
. Dichotomized variable	A B C D E	1	2	3	3	9
. Quasi-experiment	A B C D E			2	7	9
. Comparative studies	A B C D E	1	1	13	2	1
. Assumptions	A B C D E		4	12	1	
. Hypotheses	A B C D E	2	10	3	3	
. Null hypotheses	A B C D E	2	5	4	4	3
. Time series	A B C D E	1		6	5	5
. Relevance	A B C D E			10	4	4
. Probability	A B C D E		4	12	2	
. Statistical vs. practical significance	A B C D E		3	9	2	4
. Homogeneity of variance	A B C D E		1	8	3	6
. Operational definition	A B C D E	1	1	5	7	4
. Q sort	A B C D E		1	4	4	9
. Experimental unit	A B C D E		3	5	5	4

A - Thoroughly understand
B - Fair understanding
C - Some understanding
D - Have only heard of it
E - Have never heard of it

		Understanding Level				
		A	B	C	D	E
. Regression effect	A B C D E		2	8	3	5
. Factorial designs	A B C D E			3	8	7
. Appropriate error term	A B C D E			2	6	1
. Semantic differential	A B C D E				7	11
. Descriptive/inferential statistics	A B C D E		2	1	11	4
. Frequency distribution	A B C D E	3	6	4	5	
. Rectangular distribution	A B C D E			6	5	7
. Randomized blocks	A B C D E		1	5	3	9
. Statistical model	A B C D E		1	10	4	3
. Buro's Mental Measurement Yearbook	A B C D E	1	2	2	3	10
. Affective/cognitive objectives	A B C D E		2	4	6	6
. Representative sample	A B C D E		5	9	2	1
. Treatment effects	A B C D E		2	6	6	4
. Statement of a research problem	A B C D E	1	4	10	1	
. Systematic bias	A B C D E		1	6	6	5
. Action research	A B C D E	1	5	5	6	2
. Findings vs. conclusions	A B C D E		3	11	4	
. Fortran	A B C D E		1	3	9	5
. Matched groups	A B C D E		4	8	5	
. Hawthorne effect	A B C D E	2	2	5	4	5
. Projective methods	A B C D E		1	5	10	2
. Field experiment	A B C D E	1	1	8	7	1
. Baseline data	A B C D E	3	1	8	2	4
. IBM card	A B C D E	6	4	5	2	1
. Hypothetical construct	A B C D E		2	5	4	7
. BIMD	A B C D E			2		16
. 7090	A B C D E			5	2	21
. Object deck	A B C D E			4	5	9
. Nested factors	A B C D E			2	7	9
. Replication	A B C D E			2	8	8
. Orthogonal designs	A B C D E		1	2	1	14
. Card sorter	A B C D E	2	7	6	3	
. Collator	A B C D E	2	6	6	3	1
. Table of random numbers	A B C D E	3	2	2	7	4
. Fixed-random-mixed models	A B C D E	1	1	3	8	5
. Cause and effect	A B C D E	1	3	10	2	1
. ANOVA	A B C D E	1	2	3	5	7
. Rating errors	A B C D E			5	6	7
. Strong vs. weak assumptions	A B C D E		1	7	7	3
. Delimitation	A B C D E		1	7	7	3
. Confounding design	A B C D E			1	5	12

3

A - Thoroughly understand
B - Fair understanding
C - Some understanding
D - Have only heard of it
E - Have never heard of it

r the following items, encircle the code letter which best describes your owledge of the items and indicate whether or not you can do the mputation by encircling "yes" or "no."

Understanding Level Computation

				A	B	C	D	E
1. Standard scores	A B C D E	Yes	No		3	13	1	1
2. Normalizing a distribution	A B C D E	Yes	No	1	2	9	4	2
3. Standard deviation	A B C D E	Yes	No	2	4	9	2	1
4. Standard error of the mean	A B C D E	Yes	No	1	3	7	6	1
5. Confidence intervals	A B C D E	Yes	No	2		6	5	5
6. Parameter	A B C D E	Yes	No	1	1	5	5	4
7. "t" test	A B C D E	Yes	No	1	1	7	3	3
8. "F" test	A B C D E	Yes	No		2	5	4	7
9. Biserial correlation	A B C D E	Yes	No		4	4	9	7
10. Chi square	A B C D E	Yes	No		1	7	5	5
11. Reliability-validity	A B C D E	Yes	No		1	7	4	3
12. Mean	A B C D E	Yes	No	3	6	7	2	
13. Median	A B C D E	Yes	No	3	6	7	2	
14. Centile	A B C D E	Yes	No		5	9	3	1
15. Coefficient of correlation	A B C D E	Yes	No	1	1	8	5	3
16. Variance	A B C D E	Yes	No	1	1	9	6	1
17. Total sums of squares	A B C D E	Yes	No	2	2	6	5	3
18. Degrees of freedom	A B C D E	Yes	No	1	2	3	7	5
19. Interaction	A B C D E	Yes	No		1	4	5	7
20. Analysis of covariance	A B C D E	Yes	No		5	8	5	2
21. Kurtosis	A B C D E	Yes	No		1	2	2	13
22. Duncan's test	A B C D E	Yes	No			1	4	13
23. Fisher's z transformation	A B C D E	Yes	No			1	6	11
24. Intra-class correlation	A B C D E	Yes	No			1	12	5
25. Power of a test	A B C D E	Yes	No		3	3	5	7
26. Norms	A B C D E	Yes	No		2	12	3	1
27. Weighted Scores	A B C D E	Yes	No		2	10	3	3
28. Statistic	A B C D E	Yes	No	2	2	8	4	2
29. Mean square	A B C D E	Yes	No	1	2	4	7	4
30. Cross-product	A B C D E	Yes	No	1	1	2	6	8
31. Index of discrimination	A B C D E	Yes	No			2	6	10
TOTALS				80	233	570	465	472

POST - TEST SUMMARY

EVALUATION INSTRUMENT
EDUCATIONAL RESEARCH AND STATISTICS

Please encircle the code letter which best describes your knowledge of each item in the instrument.

A - Thoroughly understand
B - Fair understanding
C - Some understanding
D - Have only heard of it
E - Have never heard of it

		Understanding Level				
		A	B	C	D	E
1. Internal and external validity	A B C D E	2	15			
2. Ex post facto research	A B C D E		2	7	5	3
3. Control group	A B C D E	9	7	1		
4. Random sampling	A B C D E	7	9	1		
5. Sampling errors	A B C D E	1	10	6		
6. Type I errors	A B C D E	4	10	3		
7. Type II errors	A B C D E	4	10	3		
8. Dependent variable	A B C D E	1	11	4	1	
9. Independent variable	A B C D E	1	11	4	1	
10. Interval scale	A B C D E	2	8	3	3	1
11. Nominal scale	A B C D E	2	2	6	5	2
12. Non-parametric	A B C D E	1	5	5	6	
13. Population	A B C D E	7	8	2		
14. Continuous vs. discrete data	A B C D E	2	4	6	3	2
15. "True" experiment	A B C D E	3	5	8		1
16. Normal curve	A B C D E	9	8			
17. Dichotomized variable	A B C D E	2	4	5	6	
18. Quasi-experiment	A B C D E	4	7	6		
19. Comparative studies	A B C D E	1	12	4		
20. Assumptions	A B C D E	2	12	2	1	
21. Hypotheses	A B C D E	6	8	3		
22. Null hypotheses	A B C D E	7	7	3		
23. Time series	A B C D E	2	9	5	1	
24. Relevance	A B C D E		11	5	1	
25. Probability	A B C D E	3	9	5		
26. Statistical vs. practical significance	A B C D E	1	12	4		
27. Homogeneity of variance	A B C D E	1	5	11		
28. Operational definition	A B C D E		2	12	1	2
29. Q sort	A B C D E	3	10	4		
30. Experimental unit	A B C D E	2	8	6	1	

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		Understanding Level				
		A	B	C	D	E
31. Regression effect	A B C D E	4	11	1		1
32. Factorial designs	A B C D E	2	12	3		
33. Appropriate error term	A B C D E		2	10	3	2
34. Semantic differential	A B C D E		5	7	3	1
35. Descriptive/inferential statistics	A B C D E		6	8	1	2
36. Frequency distribution	A B C D E	4	9	4		
37. Rectangular distribution	A B C D E	1	4	6	4	2
38. Randomized blocks	A B C D E		3	12	1	1
39. Statistical model	A B C D E		6	8	3	
40. Buro's Mental Measurement Yearbook	A B C D E	1	6		8	2
41. Affective/cognitive objectives	A B C D E	1	4	7	5	
42. Representative sample	A B C D E	2	11	4		
43. Treatment effects	A B C D E	1	7	7	2	
44. Statement of a research problem	A B C D E	1	10	4	2	
45. Systematic bias	A B C D E	1	7	6	3	
46. Action research	A B C D E	1	6	7	2	1
47. Findings vs. conclusions	A B C D E		8	6	3	
48. Fortran	A B C D E		1	4	10	2
49. Matched groups	A B C D E	1	14	2		
50. Hawthorne effect	A B C D E	2	10	2	3	
51. Projective methods	A B C D E		4	9	3	1
52. Field experiment	A B C D E		5	10	2	
53. Baseline data	A B C D E	1	11	3	2	
54. IBM card	A B C D E	4	9	2	2	
55. Hypothetical construct	A B C D E			11	3	3
56. BIMD	A B C D E			3	5	9
57. 7090	A B C D E		2	5	5	5
58. Object deck	A B C D E		1	4	5	7
59. Nested factors	A B C D E	1		3	7	6
60. Replication	A B C D E		3	4	5	5
61. Orthogonal designs	A B C D E		2	2	6	7
62. Card sorter	A B C D E	2	6	7	2	
63. Collator	A B C D E	2	6	5	4	
64. Table of random numbers	A B C D E	3	7	4	2	1
65. Fixed-random-mixed models	A B C D E		4	6	6	1

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Understanding Level

			A	B	C	D	E
66.	Cause and effect	A B C D E		9	7	1	
67.	AERA	A B C D E	3	8	6		
68.	Rating errors	A B C D E		2	7	7	1
69.	Strong vs. weak assumptions	A B C D E		5	8	4	
70.	Delimitation	A B C D E		3	7	5	2
71.	Confounding design	A B C D E		2	7	7	1

For the following items, encircle the code letter which best describes your knowledge of the items and indicate whether or not you can do the computation by encircling "yes" or "no."

Understanding Level Computation

					A	B	C	D	E
72.	Standard scores	A B C D E	Yes	No	2	12	3		
73.	Normalizing a distribution	A B C D E	Yes	No	1	7	7	2	
74.	Standard deviation	A B C D E	Yes	No	2	12	3		
75.	Standard error of the mean	A B C D E	Yes	No	1	10	5	1	
76.	Confidence intervals	A B C D E	Yes	No	2	7	8		
77.	Parameter	A B C D E	Yes	No	2	7	7	1	
78.	"t" test	A B C D E	Yes	No	1	9	6	1	
79.	"F" test	A B C D E	Yes	No	1	7	9		
80.	Biserial correlation	A B C D E	Yes	No		3	3	7	4
81.	Chi square	A B C D E	Yes	No		8	8	1	
82.	Reliability-validity	A B C D E	Yes	No	1	7	9		
83.	Mean	A B C D E	Yes	No	8	8	1		
84.	Median	A B C D E	Yes	No	8	7	2		
85.	Centile	A B C D E	Yes	No	6	6	4	1	
86.	Coefficient of correlation	A B C D E	Yes	No	1	10	6		
87.	Variance	A B C D E	Yes	No	1	10	5	1	
88.	Total sums of squares	A B C D E	Yes	No		12	5		
89.	Degrees of freedom	A B C D E	Yes	No		8	6	2	1
90.	Interaction	A B C D E	Yes	No		12	4	1	
91.	Analysis of covariance	A B C D E	Yes	No		8	9		
92.	Kurtosis	A B C D E	Yes	No		3	1	3	10
93.	Duncan's test	A B C D E	Yes	No			1	7	9
94.	Fisher's z transformation	A B C D E	Yes	No		1	4	7	5
95.	Intra-class correlation	A B C D E	Yes	No		1	5	8	3

4

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		Understanding Level	Computation	A	B	C	D	E
96.	Power of a test	A B C D E	Yes No		4	8	4	1
97.	Norms	A B C D E	Yes No	1	9	7		
98.	Weighted scores	A B C D E	Yes No		6	10	1	
99.	Statistic	A B C D E	Yes No		12	5		
100.	Mean square	A B C D E	Yes No		11	5	1	
101.	Cross-product	A B C D E	Yes No	1	4	4	4	4
102.	Index of discrimination	A B C D E	Yes No			4	7	6
	TOTALS			166	694	526	231	117

SUMMARY
of
INSTITUTE EVALUATION FORM

SESSION ON PERT

	Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1.	The purposes of the Institute were clear to me.	10	8			
2.	The objectives of this Institute were not realistic.				7	11
3.	Specific purposes made it easy to work efficiently.	4	14			
4.	The participants accepted the purpose of the Institute.	8	9	1		
5.	The objectives of this program were not the same as my objectives.			1	8	9
6.	I didn't learn anything new.				3	15
7.	The material presented was valuable to me.	16	2			
8.	I could have learned as much by reading a book.				7	11
9.	Possible solutions to my problems were considered.		15	3		
10.	The information presented was too elementary.				11	7
11.	The instructors really knew their subject.	16	2			
12.	I was stimulated to think objectively about the topics presented.	9	9			
13.	New acquaintances were made which will help in future research.	7	9	2		

INSTITUTE EVALUATION FORM (Cont'd)

	Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
14.	We worked together as a group.	1	14	2	1	
15.	We did not relate theory to practice.			1	12	5
16.	The sessions followed a logical order.	8	10			
17.	The schedule was too fixed.			1	16	1
18.	There was very little time for informal conversation.				11	7
19.	I did not have the opportunity to express my ideas.				11	7
20.	I really felt a part of this group.	3	14		1	
21.	My time was well spent.	9	9			
22.	The Institute met my expectations.	5	13			
23.	I received no guide for further action.				7	11
24.	Too much time was devoted to trivial matters				11	7
25.	The information presented was too advanced.				12	6
26.	The content presented was not applicable to the work I do.				9	9
27.	Institutes of this nature should be offered again in the future.	15	3			
28.	Institutes such as this will contribute little to educational research and development.				4	14